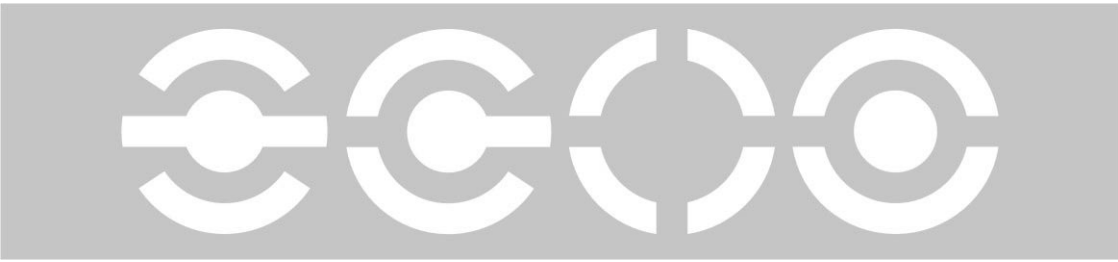
TECHNOLOGIEN MIT
VORSPRUNG



isNet Cube
isPro USB/isPro PCI

User Manual

ifak system

Copyright © ifak system GmbH 2000-2005, all rights reserved.

No part of this work may be reproduced in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping or storage in an information retrieval system - without prior written permission of the ifak system GmbH.

Information in this manual is subject to change without notice and does not represent a commitment of the ifak system GmbH.

ifak system GmbH
Oststraße 18
39114 Magdeburg

Tel.: +49 - 391 - 544 563 - 10
Fax: +49 - 391 - 544 563 - 99

Email: kontakt@ifak-system.com
www.ifak-system.de

Contents

Chapter 1: Hardware Installation

General Information 1
Documentation 1
Our Service 1

Interface isNet Cube 2
Connectors 3
LEDs 3
Technical Data 4

Interface isPro USB 5
Additional Software 6
Delivery Contents 6
PC Installation 7
System Requirements 7
Steps of Installation 7
Pin Assignment 7
Reset Process 8
Technical Data 10

Interface isPro PCI 11
Additional Software 12
Delivery Contents 12
PC Installation 13
System Requirements 13
Steps of Installation 13
Pin Assignment 14
Board Composition 15
Reset Process 16
Technical Data 17

Chapter 2: Software Installation and Configuration

Software Installation 19

Configuration Software 23
General Remarks 23

Add a Device 24
isNet Cube 25
isPro USB 27
isPro PCI 28
isPro ISA 29
Empty-Slot 30
Remove a Device 30

Appendix: Index 31

CHAPTER 1:
HARDWARE INSTALLATION

General Information

Documentation

This documentation contains important information for the secure and correct operation of the interfaces isPro USB, isPro PCI and of the Ethernet Gateway isNet Cube. Please read this documentation carefully before using one of the devices. Throughout the manual different fonts are used to indicate different meanings. A short explanation can be found below:

`Courier New:`	file names, code sequences
Arial:	names, commands, remarks
	WARNING for dangerous electrical voltage

Our Service

In case you have any questions which can't be solved by this manual, please contact our service by phone, fax or e-mail.

ifak system GmbH, Oststraße 18, 39114 Magdeburg
GERMANY

Tel.: +49 - 391 - 544 563 - 10
Fax: +49 - 391 - 544 563 - 99

Email: kontakt@ifak-system.com
www.ifak-system.de

Interface isNet Cube

The Ethernet Gateway isNet Cube consists of one main module and one to four Profibus modules. The Profibus modules are always attached to the right side of the main module (see figure).

Figure 1: The Profibus Gateway isNet Cube

Connectors

- *Main Module*

The main module is powered by 24 V attached to the screw terminals. The most left is +24 V, the second is Ground. The other 2 terminals are not used.

All other connectors are labeled. There is one connector for CAN bus and one Ethernet RJ45 connector.

- *Profibus Module*

The RS485 Profibus connector is on the Profibus module. The pin assignment of this connector is:

Pin 3: Channel B
Pin 5: Ground
Pin 6: +5V
Pin 8: Channel A

LEDs

- *Main Module*

On the main module there are a power LED and a status LED. The status LED will shine while the module is booting.

- *Profibus Module*

On the Profibus module is a status LED that will flash 3 times when a client is initializing access to the Profibus. If there is an error, then this LED will blink continuously. The other LED on the Profibus module will shine, when the module is online.

Technical Data

Table 1: Hardware capabilities of the device isNet Cube

Hardware	
Main Module	
Processor	AMD ELAN SC520-133
RAM	32 MB
ROM	8 MB
Connector	CAN, Ethernet
Operating Supply Current	typical 100 - 170 mA (by 24 V) depending on processor load
Profibus Module (one channel version)	
Processor	Motorola MC68302
RAM	128 kB
ROM	256 kB
Operation Supply Current	typical 140 mA (by 24 V)

Interface isPro USB

The advantages of the Universal Serial Bus (USB) combined with the performance of Profibus: these practically orientated features turn the device isPro USB in a state of the art fieldbus component. Desktop PCs as well as notebook devices without Profibus interfaces can be made Profibus stations within seconds based on the plug & play features of USB. The device is buspowered, thus not depending on external power connections. If the interface is not used any longer, the Profibus adapter switches off automatically to increase the running time of the notebook battery.

Figure 2: The Profibus Interface isPro USB for mobile access

Up to 16 isPro USB interfaces can be connected to one notebook or PC (depending on the hub topology). Therefore a multi-line Profibus network can be set-up easily. The mobile set-up and configuration process are improved noticeably.

There are two versions of the isPro USB interface. Only isPro USBx12 supports a transmission speed of up to 12 Mbit/s (see section "Technical Data"). In this manual both hardware versions are called alike isPro USB.

The interface relies on an independent processing unit based upon the microcontroller MC 68302. The interface contains the protocol classes DP (class 1 and 2) and DP/V1 (class 2) Master and supports a transmission speed of up to 12 Mbit/s (including the transmission speed rate of 45.45 kbit/s).

Our Profibus interfaces can be integrated in own applications due to the consistent API DLL without any effort. Applications developed for the use with the mobile isPro USB interface can be operated with the stationary isPro PCI board as well.

Additional Software

The USB interface can be combined with our components for the automation standards FDT and OPC. As optional extras, a Device Type Manager (isPro FDT) compliant to the current FDT specification version 1.2, and an OPC server software (isPro MultiServer) are available.

Delivery Contents

The delivery of the interface isPro USB includes an user manual and the driver software plus the configuration software on CD.

PC Installation

System Requirements

- To connect the isPro USB with your computer an available USB port is required.
- The operating systems Windows 2000, XP and Vista are supported.

Steps of Installation

1. Driver installation
   The driver software has to be installed **before** the hardware installation. Otherwise the operating system can't find the respective driver.
2. Reboot the PC
3. Interface installation
4. Configuration

The Interface can be connected to the Profibus network with its D-Sub connector directly. With the USB cable the interface can be connected with the PC/notebook.

Pin Assignment

Pin 3: Channel B
Pin 5: Ground
Pin 6: +5 Volt
Pin 8: Channel A

Reset Process

- *Status LED function in the version isPro USBx12*

The device contains two LEDs. The left, green LED (1) indicates the presence of the operating voltage. It flashes with the beginning of the initialization.

While initializing or resetting the right LED (2) flashes in red colour. After the end of the initialization/reset process it should darken again. A still flashing red LED indicates the occurrence of an error during start-up/reset.
The color yellow shows the correct operating status und signalizes that the interface holds the token.

Figure 3: The LEDs of the version isPro USBx12

- *Status LED function in the version isPro USB*

The device contains two LEDs. The upper red LED (1) indicates the presence of the operating voltage.

While initializing or resetting the lower green LED (2) flashes. After the end of the initialization/reset process it should darken again. A still shining LED indicates the occurrence of an error during start-up/reset.

Figure 4: The LEDs of the version isPro USB

Technical Data

Table 2: Hardware capabilities of the device isPro USB

Hardware	
Profibus	
Processor of is Pro USBx12	MC 68302, ASPC2
Processor of is Pro USB	MC 68360
DP-RAM	16 kByte
Connector	RS-485
Transmission speed of is Pro USBx12	9.6 kbit/s up to 12.0 Mbit/s
Transmission speed of is Pro USB	9.6 kbit/s up to 1.5 Mbit/s
Baud rate	45.45 kbit/s
USB	
Conncetor	1 device connector
Transmission speed	12 Mbit/s
Operation	up to 16 devices in parallel

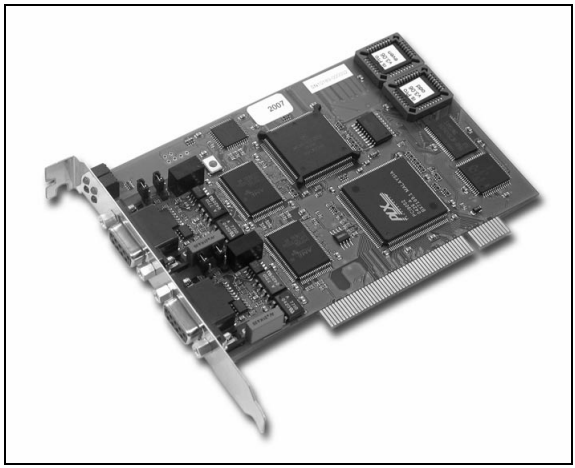
Table 3: Software capabilities of the device is Pro USB

Drivers	
Interfaces	DLL
Optional interfaces	FDT, OPC
Operating systems	Windows 2000, XP and Vista

Interface isPro PCI

As a multi-protocol interface our PC board isPro PCI offers a broad Profibus range. The master interface can be connected directly to two channels. Every channel can be configured to perform a different protocol version. In the same time an application can run the protocol classes DP (class 1 and 2) and DP/V1 (class 2) Master as well.

Figure 5: The Profibus board isPro PCI



Used as a multi-channel interface the PCI board is able to serve these two physical channels in parallel without limiting the performance of the host PC. Therefore the interface isPro PCI relies on an independent processing unit based upon the microcontroller MC 68302. Using the Profibus microcode of Motorola working in parallel is made possible.

The board is equipped with a configuration program which allows a comfortable addition of the interface to an existing configuration and simultaneously to check and fix the resources.

There are two versions of the isPro PCI board.

Only isPro PCIx12 supports a transmission speed of up to 12 Mbit/s (see section „Technical Data“). In this manual both hardware versions are called alike isPro PCI.

Additional Software

The interface can be combined with our components for the automation standards FDT and OPC. As optional extras, a Device Type Manager (isPro FDT) compliant to the current FDT specification version 1.2, and an OPC server software (isPro MultiServer) are available.

Delivery Contents

The board isPro PCI is delivered with a user manual (English/ German) and the driver and configuration software on CD.

PC Installation

System Requirements

- A PCI slot must be available on your motherboard.
- The operating systems Windows 2000, XP and Vista are supported.
- At least 16 kbyte of memory must be left for the PCI board.

Steps of Installation

1. Driver installation
   The driver software has to be installed **before** the hardware installation. Otherwise the operating system can't find the respective driver.
2. Reboot the PC
3. Setting of the bus termination (Jumper) if necessary
4. Install the interface into the PC
5. Configuration

ATTN: The interface should only be inserted into the computer after the power supply of the PC was switched off.

- Switch your computer off, but don't disconnect it from the power line.
- **To reduce the risk of damage to the sensitive electrical components on the board, you must make contact to the chassis of your computer before touching the interface.**
- Disconnect your computer from the power line.
- Then open your computer housing.
- Choose an available PCI slot.
- Remove the corresponding blind bracket.

- Insert the board into the slot and screw the mounting bracket to the housing.
- Reboot the PC.

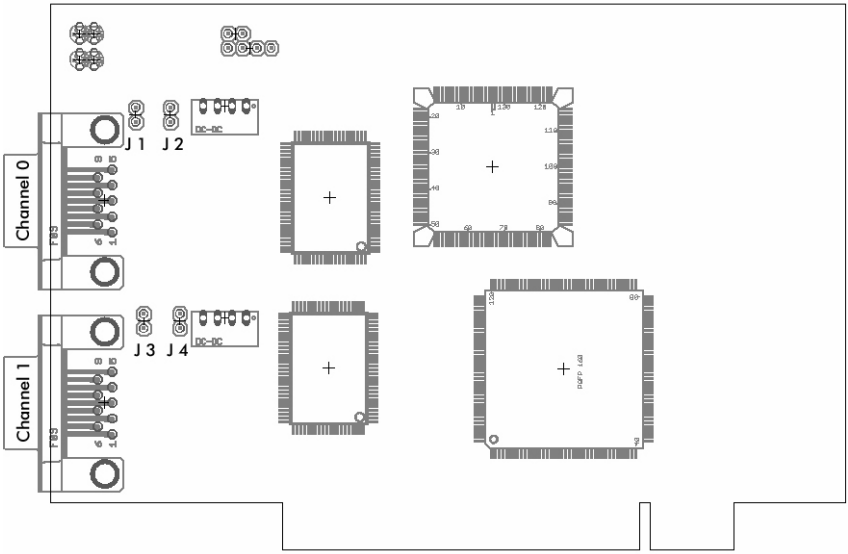
Pin Assignment

Pin 3: Channel B
Pin 5: Ground
Pin 6: +5 Volt
Pin 8: Channel A

Board Composition

The isPro PCI permits the connection of two Profibus channels (channel 0 and channel 1). The following figure shows the board in a schematic way.

Figure 6: Board isPro PCIx12



There are four jumpers on the board which aren't activated when the board is supplied. They serve to set the bus termination resistors for the corresponding channels (see table below). The resistor is necessary for all stations which have to terminate the Profibus line.

Table 4: Setting of the bus termination

Termination resistor	Channel 0 J1, J2	Channel 1 J3, J4
Activated	set	set
Deactivated	open	open

Reset Process

The board contains four LEDs (2 green, 2 red). They indicate the success/failure of the reset and start-up process. While resetting the microcontroller all LEDs flash. After the end of the reset process they should darken again. A still shining LED indicates the occurrence of an error during reset/start-up.

Technical Data

Table 5: Hardware capabilities of the device isPro PCI

Hardware	
Processor	MC 68302, ASPC2
DP-RAM	16 kByte
Connector	RS-485
is Pro PCIx12 Transmission speed	9.6 kbit/s up to 12.0 Mbit/s
is Pro PCI Transmission speed	9.6 kbit/s up to 1.5 Mbit/s
Operating voltage	5 Volt
Operating current	max. 800 mA
Supported bus clock	33 MHz

Table 6: Software capabilities of the device isPro PCI

Drivers	
Interfaces	DLL
Optional interfaces	FDT, OPC
Operating systems	Windows 2000, XP and Vista

CHAPTER 2:
SOFTWARE INSTALLATION AND CONFIGURATION

Software Installation

The driver software has to be installed **before** the hardware installation. Otherwise the operating system can't find the respective driver.

The driver software delivered with our Profibus interfaces permits the access to the Profibus-Firmware under the operating systems Windows 2000, XP and Vista. The interface between application and Profibus firmware comes in the shape of a Dynamic Link Library (DLL). The supported operating systems are detected automatically by the driver DLL.

The configuration of the interface can be done fast and easily with the configuration software `isPro Configurator` which is installed into the ifak system directory of the Start Menu.

The driver software is placed on the enclosed CD. The installation follows the steps mentioned below:

- Login as administrator under the operating systems Windows 2000, XP and Vista.
- Insert the installation CD into your CD drive.
- Start `setup.exe` and proceed according to the instructions displayed on the screen.
- The software is installed in the default program directory of your computer under the subdirectory ″`ifak system\isPro Multidriver\`″.

The install shield offers a choice of the driver according to the hardware:

- **USB** for the device isPro USB
- **PCMCIA** for the device isPro PCMCIA
- **ISA** for the board isPro ISA
- **PCI** for the board isPro PCI

Figure 7: Installation software: Choice of the installation type

All necessary steps to a successful installation of your driver are then done automatically. After finishing the installation process, please reboot your computer!

The following files are installed on your computer:

DLL\isMBDrv.dll	the Dynamic Link Library providing access to the firmware (driver DLL)
DLL\isMBDrv.lib	the corresponding library for C/C++ environments
Necessary header files for C/C++ environments:	
Main Modules:	
isMB.h	exports the main module's functions and data types
isMBDef.h	exports definitions, like error codes and protocol IDs, contains the overview over supported protocols
Protocol-Modules:	
Dpem.h:	exports the DPEM module's functions
DpemDef.h	exports the DPEM module's data types and definitions
Fmsm.h:	exports the FMSM module's functions

Configuration Software

To ease the task of hardware configuration the configuration software `isPro Configurator` is provided. It is installed in the Start Menu. This simple dialog based program allows the easy addition and removal of the is Pro interfaces and of the Ethernet Gateway isNet Cube. It also checks the available resources of the system.

Each device is assigned to a certain number which enables the software to address the device. Empty devices can be included in order to allow gaps in the enumeration of devices.

General Remarks

While the configuration software is running the device drivers of the hardware are stopped. All applications requiring access to the devices should be terminated before the start of the configuration software.

After the termination of the configuration software the device drivers are started again. The new parameters are available at once for all interfaces.

ATTN: Although carefully designed the resources permitted by the configuration software may not guarantee the correct operation of the devices. The program uses the capabilities provided by the Windows NT API. Mainboard limitations or other restrictions may render a correct resource detection impossible. ifak system does not accept any liability for the parameters provided by the software.

Add a Device

Please press the button `Add`, choose the device type you would like to add. Then make your settings.

Figure 8: Configuration Software: Add an USB device

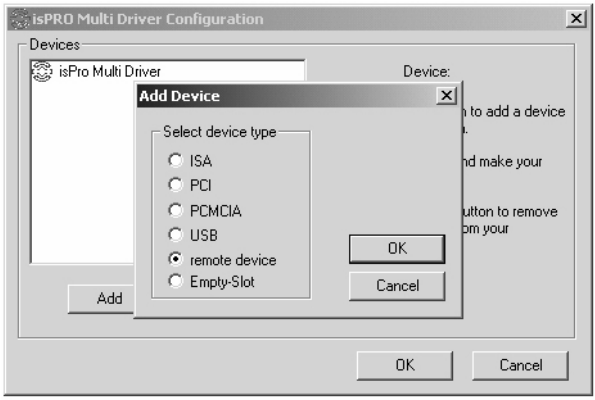
Choose the device type "`remote device`" when you you want to configure access to the Ethernet Gateway isNet Cube.

When adding a PCI board the configuration software searches for available resources and assigns them automatically to the new device. Marking the device allows the manual change of any parameter.

isNet Cube

Add a device of type „remote device“.

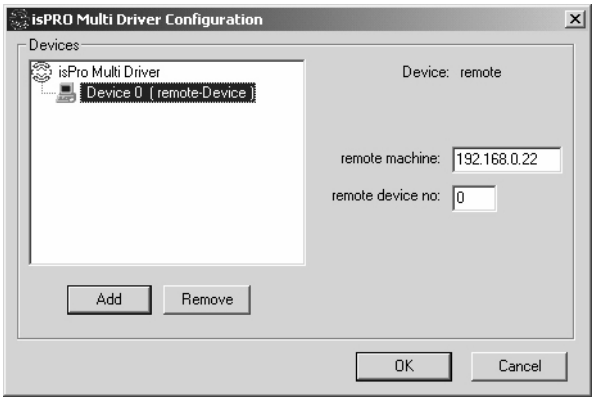
Figure 9: Configuration Software: Add a gateway interface



Select the added device and specify the isNet Cube you want to work with. You may enter the serial number, the IP address or the DNS name of the isNet Cube. When you want to use the serial number, you need to ensure that the Gateway is in the same network.

The second number specifies the module number of the attached Profibus modules. The first Profibus module has number zero.

Figure 10: Configuration Software: Settings for the Ethernet gateway



isPro USB

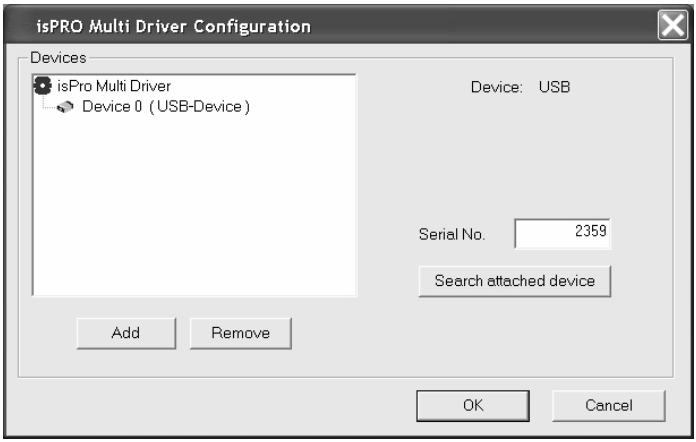
The USB interface possesses a serial number for clear identification. The number is located on the upside of the case and stored internally.

When adding an USB device for the first time under Windows NT 4.0 the program checks whether the driver software has been installed correctly and not until set the system free. Therefore it is necessary to reboot the PC.

The configuration software offers the possibility to search automatically for all attached devices and to detect their serial numbers.

When you are working under Windows 2000, XP or Vista just fill in your settings and end with `OK`.

Figure 11: Configuration Software: Settings for the USB interface

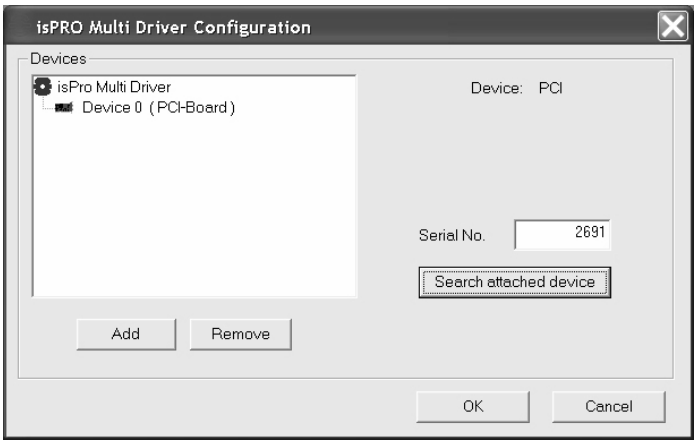


isPro PCI

The interface isPro PCI possesses a serial number for clear identification. The number is stored internally. The configuration software offers the possibility to search automatically for all attached devices and to detect their serial numbers.

When you are working under Windows 2000, XP or Vista just fill in your settings and end with OK.

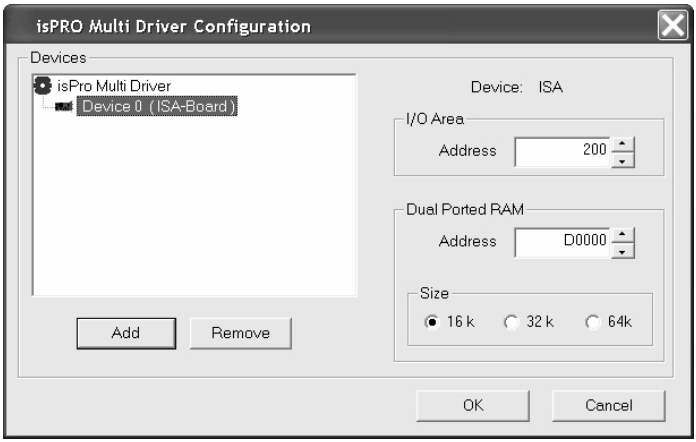
Figure 12: Configuration Software: Settings for the PCI board



isPro ISA

The size and address of the dual ported RAM as well as the I/O port address can be adapted to the users needs. The value of the I/O port address must be equal to the one set on the board.

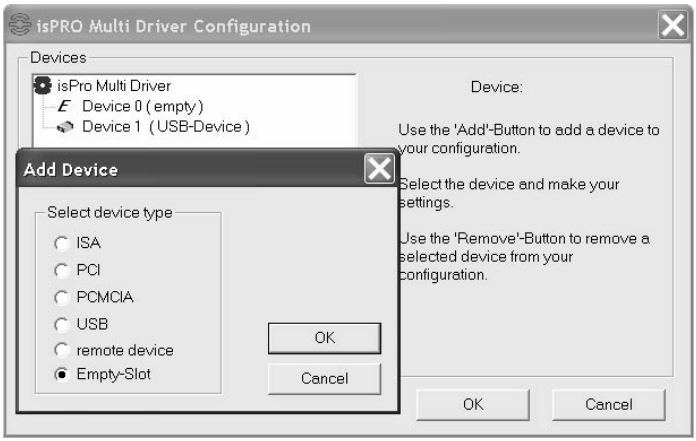
Figure 13: Configuration Software: Settings for the ISA board



Empty-Slot

The empty device does not contain any resources. It serves as a substitute for device numbers not assigned. Using this devices enables a free enumeration of devices by inserting empty devices between the real ones.

Figure 14: Configuration Software: add an empty slot



Remove a Device

Mark the device you wish to remove and press the button `Remove`.

INDEX

B

Bus Termination 15

C

Configuration Software 23

D

Delivery Contents
- is Pro PCI 12
- is Pro USB 6

Device
- Add 24
  - Empty-Slot 30
  - isNet Cube 25
  - isPro ISA 29
  - isPro PCI 28
  - isPro USB 27
  - Remote device 24
- Remove 30

Documentation 1

H

Hardware
- isPro PCI
  - Board Composition 15

I

Installation
- isPro PCI 13
- isPro USB 7

Interface
- isNet Cube 2
- isPro PCI 11
- isPro USB 5

J

Jumper 15

L

LED
- isNet Cube 3
- isPro PCI 16
- isPro USB 8
- isPro USBx12 8

P

Pin Assignment
- isNet Cube 3
- isPro PCI 14
- isPro USB 7

R

Reset Process
- isNet Cube 3
- isPro PCI 16
- isPro USB 8

S

Service 1

Software
- Configuration 23
- Driver 19
- Installation 19

System Requirements
- isPro PCI 13
- isPro USB 7

T

Technical Data
- isNet Cube 4
- isPro PCI 17
- isPro USB 10